

WHAT IS CLAIMED IS:

1. An inverter for converting a DC input voltage into an AC output voltage using a sigma-delta modulation (SDM), comprising:

a sigma-delta modulation (SDM) controller for producing a modulated output voltage signal according to a reference voltage signal;

a driving circuit electrically connected to said SDM controller for producing a driving signal according to said modulated output voltage signal; and

a power inversion stage circuit electrically connected to said driving circuit for producing said AC output voltage according to said driving signal.

2. The inverter according to Claim 1, wherein said SDM controller comprises:

an integrator circuit for producing an integrator output signal according to a difference between said reference voltage signal and said modulated output voltage signal;

a sample-and-hold circuit electrically connected to said integrator circuit for sampling and holding said integrator output signal; and

a quantizer circuit electrically connected to said sample-and-hold circuit and electrically connected to an input terminal of said integrator circuit through an output terminal thereof for quantizing said integrator output signal and producing said modulated output voltage signal.

3. The inverter according to Claim 2, wherein said integrator circuit is an integrator.

4. The inverter according to Claim 3, wherein said integrator is a differential integrator.

5. The inverter according to Claim 2, wherein said sample-and-hold circuit is a sample-and-hold device and is controlled by an external sampling signal.
6. The inverter according to Claim 2, wherein said quantizer circuit is a two-level quantizer.
7. The inverter according to Claim 6, wherein said two-level quantizer is a two-level comparator.
8. The inverter according to Claim 1, wherein said modulated output voltage signal is a pulse train.
9. The inverter according to Claim 1, wherein said reference voltage signal is input from an external signal generator.
10. The inverter according to Claim 1, wherein said driving circuit is a high/low side driver.
11. The inverter according to Claim 1, wherein said power inversion stage circuit comprises:
  - a power stage circuit electrically connected to said driving circuit for producing a AC power signal according to said driving signal and said DC input voltage; and
  - a filter circuit electrically connected to said power stage circuit for producing said AC output voltage according to said AC power signal.
12. The inverter according to Claim 11, wherein said power stage circuit is in a full-bridge configuration.
13. The inverter according to Claim 12, wherein said full-bridge configuration is a H-diagonal structure comprising four power switches.
14. The inverter according to Claim 13, wherein each of said four power switches is a MOSFET.

15. The inverter according to Claim 11, wherein said filter circuit is a low-pass filter.
16. The inverter according to Claim 11, wherein said filter circuit comprises an inductor and a capacitor in series.
17. A controller for producing a modulated output voltage signal according to a reference voltage signal, comprising:
- an integrator circuit for producing an integrator output signal according to a difference between said reference voltage signal and said modulated output voltage signal;
  - a sample-and-hold circuit electrically connected to said integrator circuit for sampling and holding said integrator output signal; and
  - a quantizer circuit electrically connected to said sample-and-hold circuit and electrically connected to an input terminal of said integrator circuit through an output terminal thereof for quantizing said integrator output signal and producing said modulated output voltage signal.
18. The controller according to Claim 17, wherein said integrator circuit is an integrator.
19. The controller according to Claim 17, wherein said integrator is a differential integrator.
20. The controller according to Claim 17, wherein said sample-and-hold circuit is a sample-and-hold device and is controlled by an external sampling signal.
21. The controller according to Claim 17, wherein said quantizer circuit is a two-level quantizer.
22. The controller according to Claim 21, wherein said two-level quantizer is a two-level comparator.

23. The controller according to Claim 17, wherein said modulated output voltage signal is a pulse train.
24. The controller according to Claim 17, wherein said reference voltage signal is input from an external signal generator.
25. The controller according to Claim 17, wherein said controller is a SDM controller.